Progress Report

Office of international Health Programs (EH-63), Department of Energy

Title of Project: **Assembling the cohort for Ukrainian-American Eye-Cataract Study**

Principal Investigator: Vadim V. Chumak

Period covered by this report: 1 April – 30 September 1998

I. Summary of Work

The goal of the project is to select the cohort for the ophthalmic examinations within the scope of Ukrainian-American Eye Cataract Study. The plan includes selection of potential members of studied cohort (based on dosimetric criteria), contacting the selected Liquidators and inviting them to participate in the ophthalmic follow-up. The work is planned to be accomplished over a two-year period, e.g. during the first 12 months a cohort of 6,000 subjects will be assembled.

II. Milestones and Deliverables Accomplished during the Reporting Period

Three milestones were included into the Annual Work Proposal. Fulfillment of all those milestones was conducted during the reporting period. A short summary of the results is presented in the following sub-sections.

Milestone 1. ***Inventory and update existing reliable dosimetric information and screen for incoming individuals with doses reconstructed retrospectively.***

This task was to a large extent accomplished during the first semester of work. However, the following progress was achieved during the reporting period:

1. Accumulation of tooth samples from the liquidators residing in the oblasts (regions) of interest. However, due to deficiency of domestic funding, this work was conducted at a very low level. During the second quarter, teeth from only 99 liquidators were collected in respective regions of Ukraine for dose reconstruction purposes.
2. Some progress was achieved in negotiation about getting access to the individual dosimetric monitoring files of the facilities involved into clean up. According to the agreement with Dr.Krjuchkov from the Institute of Biophysics (Moscow), the copy of databases he is going to purchase in near future will be provided to UACOS. These files will include high quality

individual dose records of workers of the USSR Ministry of Atomic Energy, Ministry of Middle Machinery and other former Soviet Union bodies, which were performing work during Chernobyl clean-up. So far, this information is dispersed in a number of local databases, some of them owned by private persons, which are not available to us. However, practical application of these lists will require a linkage of these databases with the sources containing up-to-date addresses of the liquidators (possibly the State Registry files) and tracing of those liquidators.

3. The files with the names and doses of atomic workers in Ukraine were received from the State Company Energoatom. These files include individual dose records of the workers of all five nuclear power plants in Ukraine. So far, a total of 1200 atomic workers with different dose levels were included into these lists. Potentially (in case of need) this number may be extended to more than 13,000 individuals who are currently dosimetrically monitored at Ukrainian NPP.

Although analytical (physical) dose reconstruction is still performed at Chernobyl NPP, no data transfer took place during the reporting period. This transaction is scheduled for the near future and will reported in the progress report, related to the next (the 3rd) semester.

Milestone 2. ***Tracing and locating the Liquidators selected from dosimetric criteria.***

This milestone was basically accomplished during the 1st semester. During the site visits, the lists of liquidators, which had been provided by the State Registry, were verified and filtered. The results of this filtering are graphically presented at Fig.1. In five oblasts, the total number of liquidators with registered individual doses had been reduced by 15% (from 28,364 persons down to 24,144 individuals). As was demonstrated during the postal survey, even in this data (which was updated according to the information available at the oblast (region) and rajon (district) levels of the Registry - see Progress report #1), another 4% of liquidators turned out to be lost for follow-up due to errors in home address and not accounted migration. Thus, the original lists of the State Registry are only about 80% usable for the purpose of tracing and locating the liquidators.

In case of EPR dosimetry data file, practically absolute result was achieved because of registering most recent address and liquidator status while tooth extraction.

Tracing and locating the liquidators who were included into analytical (physical) dose reconstruction database is more difficult. This deficiency is caused by the lack of address information in the files provided by Chernobyl NPP. Another cause of the problem is not accounting for migration of liquidators (death and emigration). During the 1st semester, for only 1,622 (76%) of total 2,121 records the home addresses were recovered after intense work in archives.

Tracing of atomic workers for the purposes of UACOS was quite easy because those professionals are receiving medical care in special hospitals, subordinated not to territorial health care bodies but to the special branch of the Health Ministry. Thus, all those individuals who are included into the atomic worker lists are easily accessible for medical examination. This assumption was confirmed by the subsequent experience of epidemiological and ophthalmic branches of UACOS.

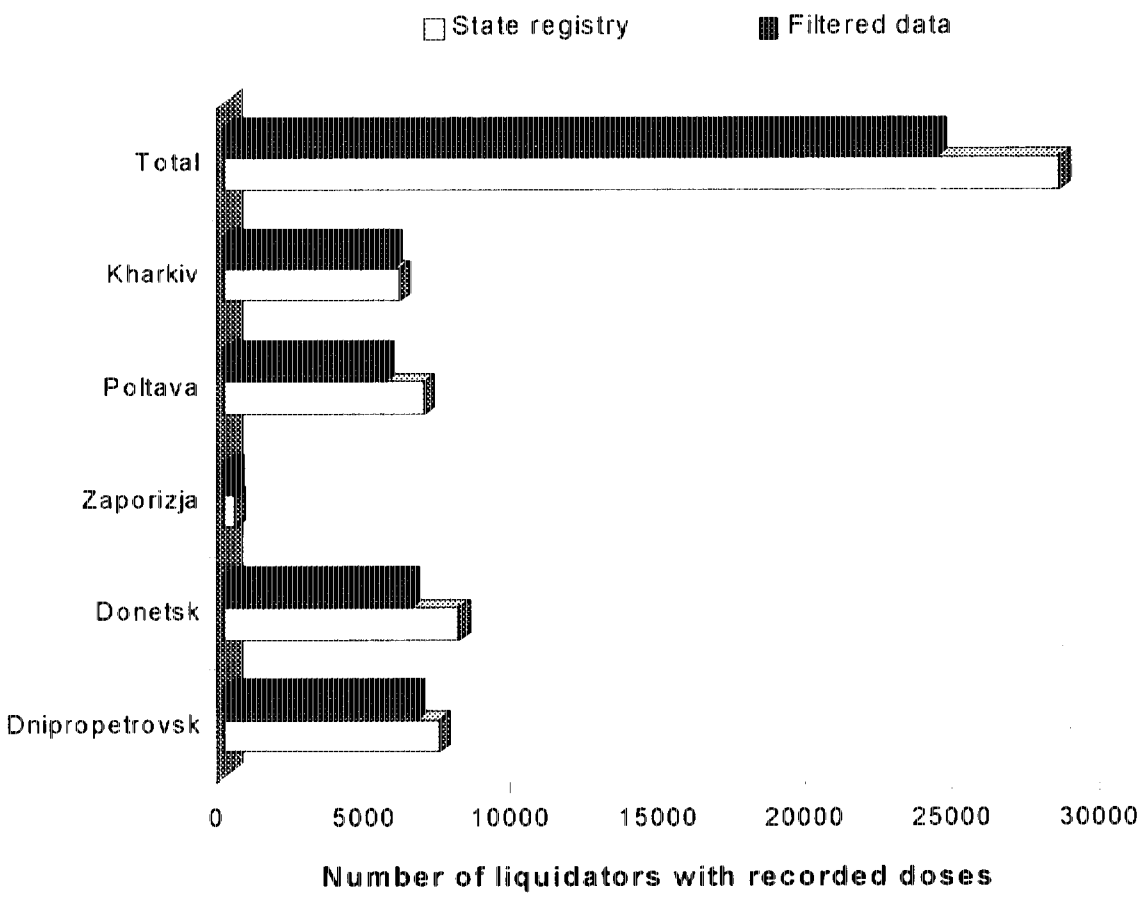

Fig.1. The number of liquidators with recorded individual doses in five oblasts (regions) of Ukraine according to the data of the State Registry and after filtering of the most up-to-date information.

Milestone 3. ***Enlisting patients into the study.***

The major deal of work during the 2nd semester was related to enlisting the patients into the study.

As was explained in the first progress report, postal contact with liquidators is a method of choice in the problem of enlisting patients into the study. Such contact was performed using special information package, which includes a statement of goals and conditions of the study, dosimetric mini-questionnaire and instruction regarding filling out the questionnaire. The questionnaire itself had included several questions of dosimetric significance and a separate item acquiring willingness of the patient to participate in ophthalmic follow-up.

During the 1st semester, this approach was tested in one (Dnipropetrovsk) oblast. We had considered the questionnaires with positive response to the question regarding willingness to take part in the study. Among those, the liquidators who had indicated their affiliation to Administration of Construction #605 (AC-605) or military were enlisted into the study. By the end of the first semester, a total of 1,080 individuals were included into the lists and forwarded to epidemiological branch of UACOS.

The first experience of postal contact was found to be satisfactory. The only correction needed, was an inclusion of questionnaire filling guidelines into the package. The ultimate response rate was at level of 38%, 5% of packages returned undelivered due to erroneous address. Their willingness to participate in follow-up had expressed 97% of respondents.

Dynamics of the response is illustrated at Fig.2. In fact, response was quite prompt, providing a cumulative of 70% within 30 days after the release of our letters. The maximum daily influx of responses was observed on 15-20 day of survey. By the time of writing this report, a total of 2,434 mini-questionnaires from the residents of Dnipropetrovsk oblast were received, among them 2361 (97%) had expressed their interest to participate in ophthalmic follow-up.

Basing of the positive results of first mailing exercise, a second run of postal survey was initiated in four other remote oblasts of Ukraine. 6,455 packages were sent to the liquidators residing in

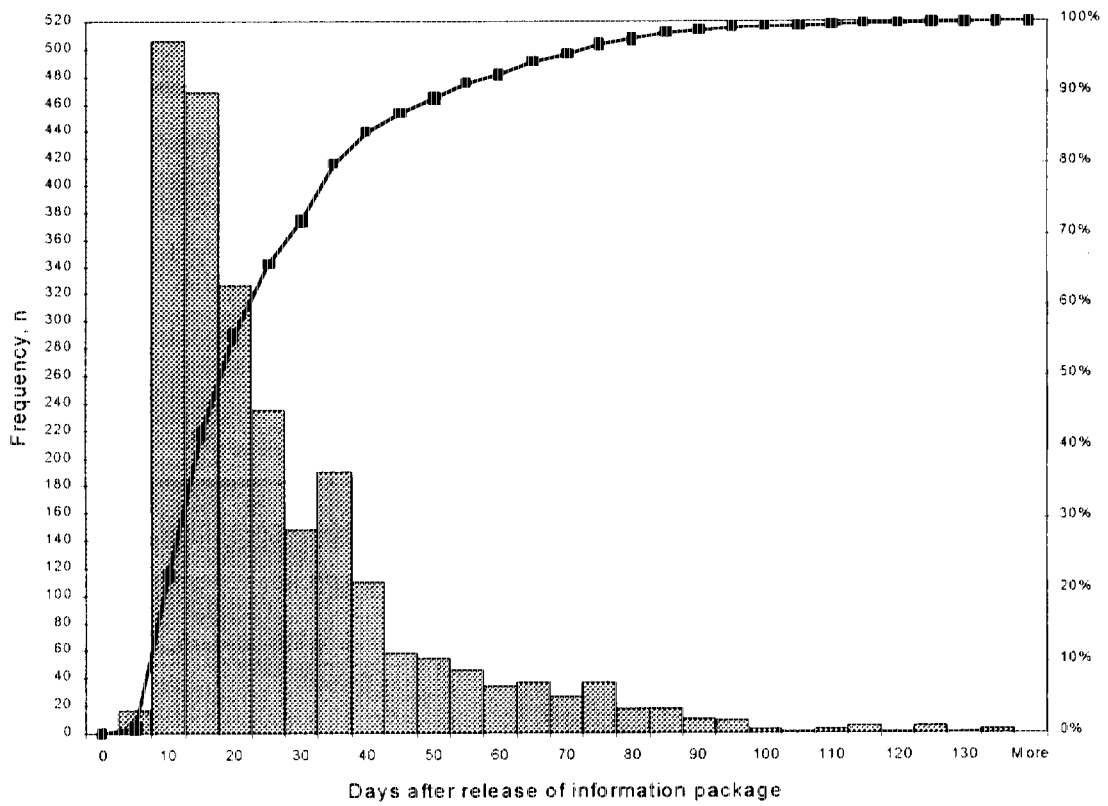

Fig.2. Dynamics of response to the postal contact. Data of Dnipropetrovsk oblast.

Dnipropetrovsk, Donetsk, Kharkiv and Poltava oblasts. In the last oblast the packages were issued for 25% of liquidators included into the State Registry lists. For other oblasts, the survey coverage rate was 42-49%.

For the time being, responses from liquidators are still coming back. So far, have been received only about 48% of projected responses. Most of the remaining responses to the second bid of postal survey are expected to come within next one of two months. Meantime, the third bid of postal survey materials is being prepared for release.

Totally, during the 2nd semester, 2,388 liquidators were enlisted into a study using a postal contact approach.

However, only 99 liquidators whose teeth were collected during a routine dental practice and were accumulated in the Central Bioprobe Bank were enlisted into the study. The main reason of this more than modest performance is deficiency of domestic funding for support of the Nation wide tooth acquisition network, which was established and began to operate in 1996-1997.

During the 2nd semester none of Chernobyl NPP ex-workers with doses reconstructed analytically were enlisted into the study. In principle, the present resource of analytical dose reconstruction data is practically exhausted. Although another set of reconstructed doses is expected to be transferred from Chernobyl NPP, in general, a cohort of liquidators – NPP staff is almost completely covered with dose reconstruction and one should not expect significant influx of those liquidators into UACOS.

As mentioned above, a group of atomic workers is extremely well organized cohort, easily accessible for follow-up and long term medical examination. During the 2nd semester a total of 1,200 individuals were enlisted into the study. Another peculiarity of this cohort is its exterritorial status. Traditionally, employees of atomic industry are medically cared not by local hospitals but by the division subordinated to a special branch of the Health Ministry and funded directly by the State company Energoatom.

The results, achieved during the first year of cohort assembling are summarized in Table 1. As may be seen from the table, the major source of information about the liquidators is the State Registry. Moreover, since EPR and analytical dose files gave quite limited yield during the 2nd semester, the role of this source is increasing. Distribution of enlistees in oblasts of interest is so far uneven. Kiev region has rather high coverage with EPR and analytical dosimetry. Higher number of patients in Dnipropetrovsk oblast reflects completion of the postal survey in this region. In other oblasts, postal enlisting is still in progress, yet giving sufficient material for initiation of ophthalmic examination. Quite limited number of enlisted liquidators in Zaporizja oblast simply reflects much lower liquidator population in this region. In general, assembling of UACOS cohort is progressing well, providing sufficient material for epidemiological and ophthalmic branches of the study.

Table 1. Summary of cohort assembling during the first year of work

Region	Source of dosimetric information				Total
	EPR	Analytical	State Registry	Individual monitoring	
Kharkiv	37	5	439		481
Poltava	12	3	181		196
Zaporizja	17	10	19		46
Donetsk	3	6	468		477
Dnipropetrovsk	14	39	2361		2414
Kiev	364	1321	0		1685
Atomic workers				1200	1200
Total	447	1384	3468	1200	6499
Including:					
1st semester	348	1384	1080	-	2812
2nd semester	99	0	2388	1200	3687

III. Other relevant information

During the reporting period, several trips related to the project were made (see Financial Reporting Format). In four of them (which took place at time closely preceding the reporting period) the destination was Chernobyl NPP and a State Enterprise RADEC. The aim of these trips was to work in archives of Chernobyl NPP in order recover missing information regarding ID data of liquidators. This task was accomplished. Another task – negotiation with representatives of RADEC regarding transfer of databases related to individual monitoring of civil liquidators had only partial success. Although no immediate agreement was achieved, this visit had facilitated transfer of these data to Dr.Krjuchkov (Moscow) and then to UACOS. Three other trips were related to the International Conference on Biodosimetry and ESR Dosimetry and Applications, being held in Obninsk (Russia). The talk by V.Chumak, S.Sholom and L.Pasalskaya entitled "Application of EPR dosimetry for full-scale epidemiological studies" was presented at the conference. This presentation, in particular, had reflected practical issues of application of EPR dosimetry to dosimetric support of UACOS.

IV. Publications

V.Chumak, I.Likhtarev, S.Sholom, R.Meckbach, and V.Krjuchkov Chernobyl experience in field of retrospective dosimetry: reconstruction of doses to the population and liquidators involved in the accident. *Radiat.Prot.Dosim.* 77, No.1-2, pp.91-95 (1998).